

Short Update on e+D BeAGLE Full Simulations

Alex Jentsch

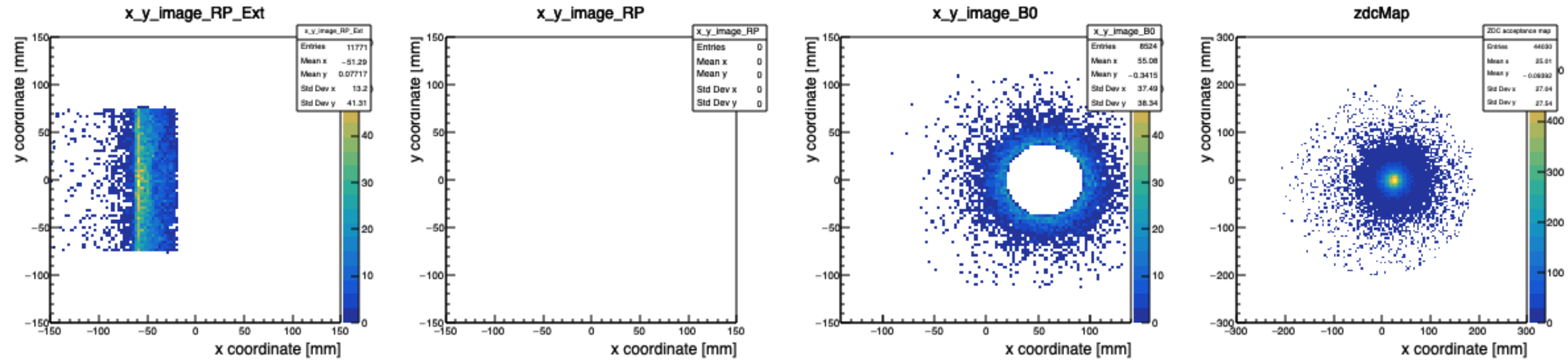
BeAGLE Meeting

3/25/2020

What has been done since Temple?

- Many smearing effects are now included.
 - Angular divergence
 - Beam energy spread*
 - Crab cavity rotation (vertex smearing)
 - Silicon pixel smearing (for protons)
- The energy resolution of the ZDC is "there", but I need to understand what to expect for how it should affect p and p_t .
- The effect of the beam energy spread seems too small.
- Note: I found a bug in how I calculate t and t' .
 - t' is fixed, still an issue with t (you'll see what I mean) – should have it sorted in a day or two.

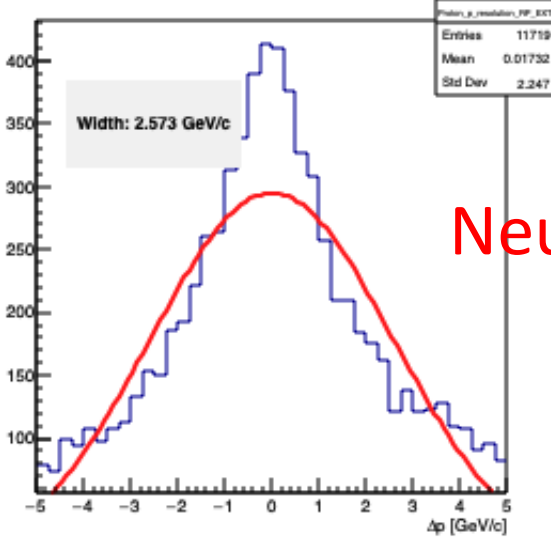
Spectator Neutron (18x100 GeV)



- Normal Roman Pots turned off for now – they capture almost nothing and add extra complexity.
- The External Silicon Sensors are “shifted” – this is a technical issue to derive the transport matrix (I can provide details for anyone interested).

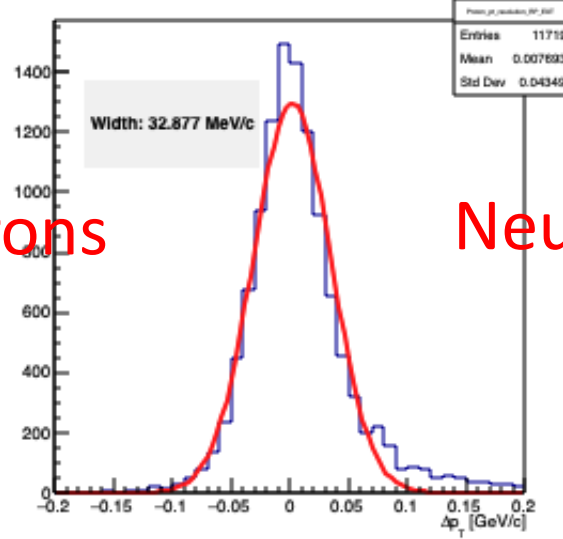
Spectator Neutron (18x100 GeV) – absolute smearing

proton_p_resolution_RP_EXT



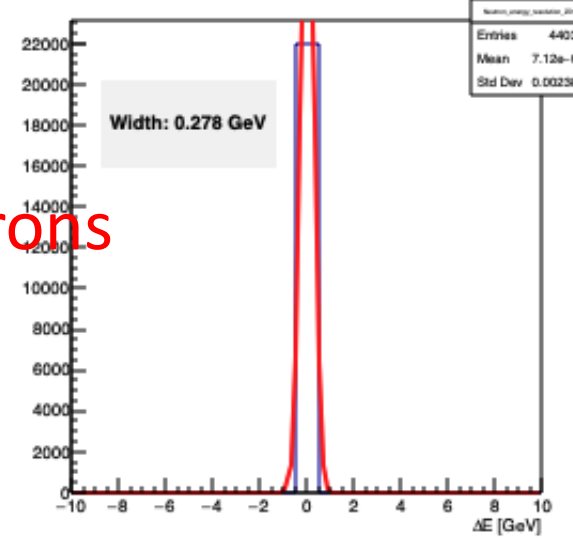
Neutrons

proton_pt_resolution_RP_EXT

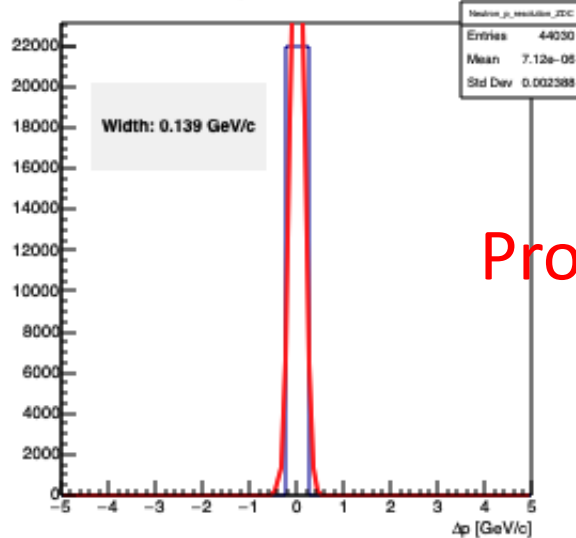


Neutrons

neutron_energy_resolution_ZDC

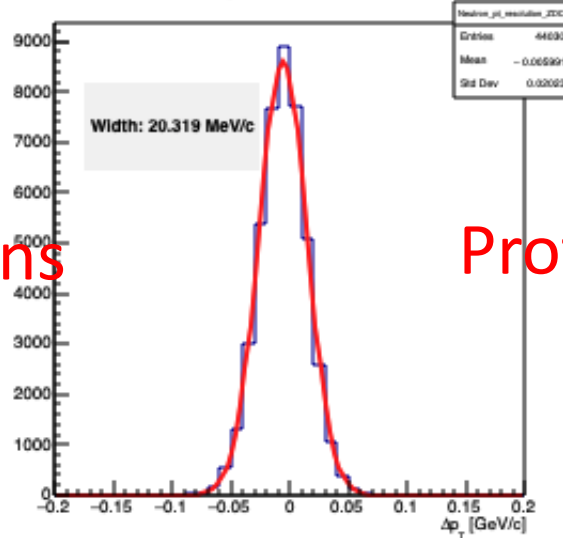


neutron_p_resolution_ZDC



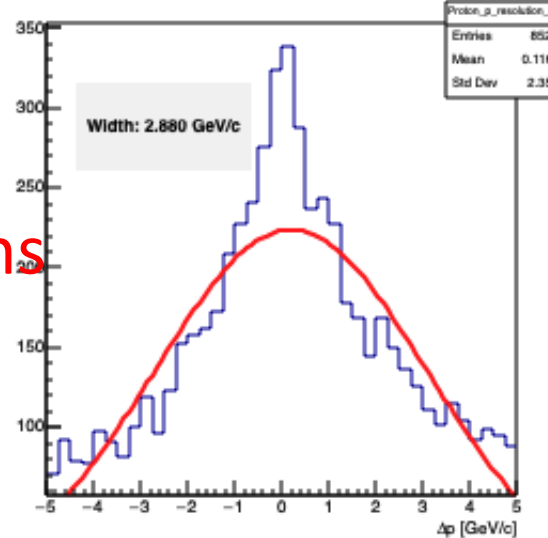
Protons

neutron_pt_resolution_ZDC

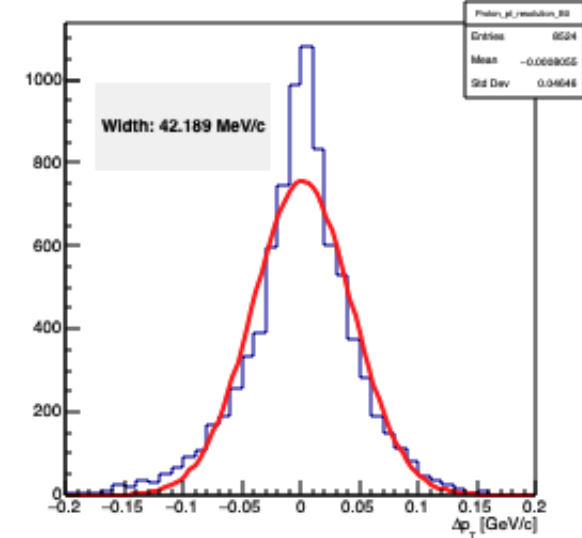


Protons

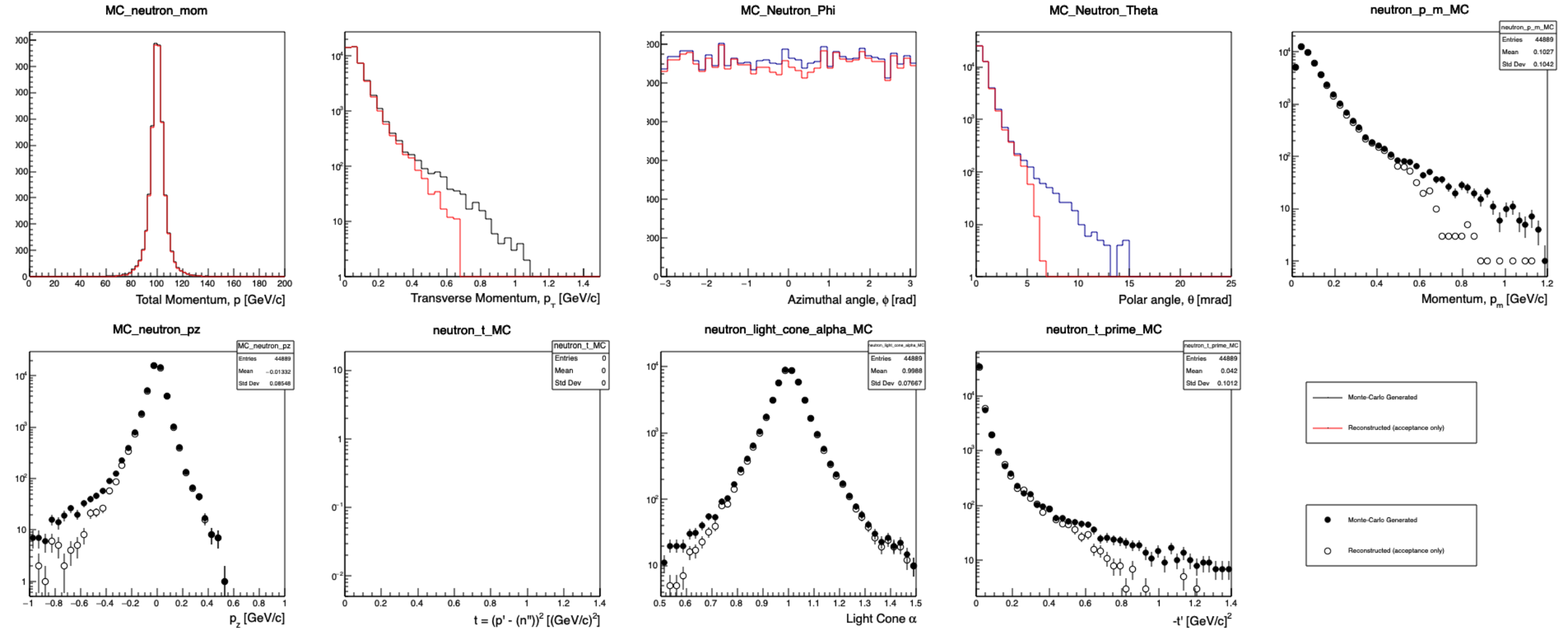
proton_p_resolution_B0



proton_pt_resolution_B0



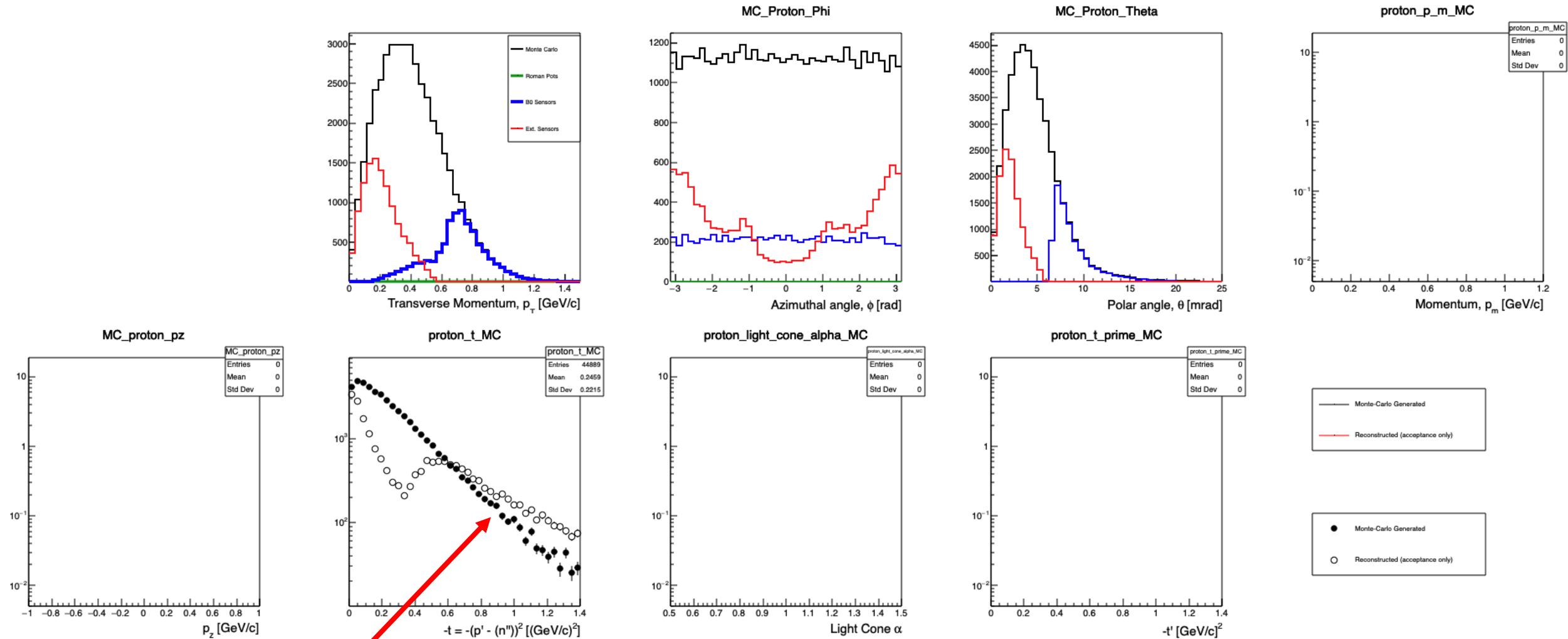
Spectator Neutron (18x100 GeV)



No detector smearing (e.g. energy resolution). All other contributions included.

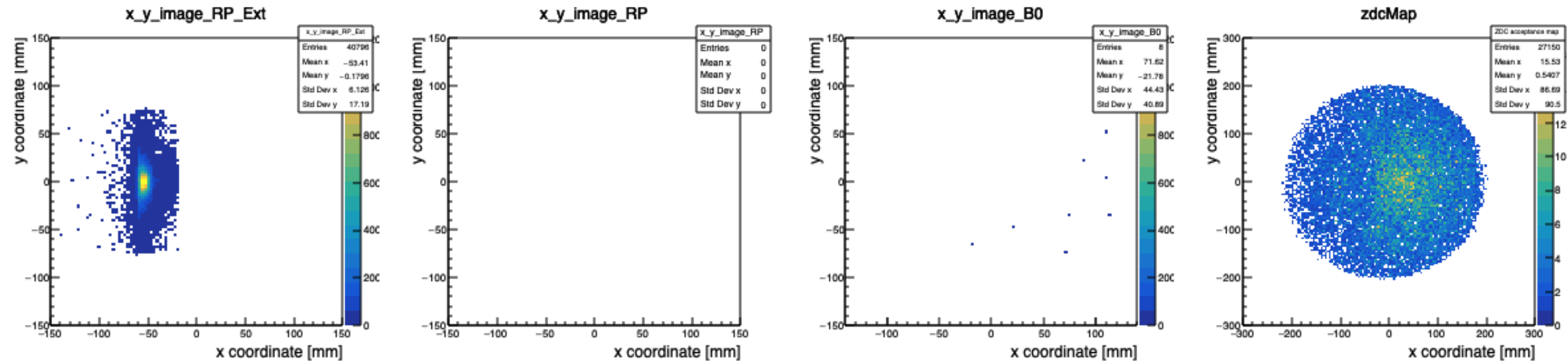
Question: what is your preferred method to quantify the difference between MC and “detected”?

Spectator Neutron (18x100 GeV)



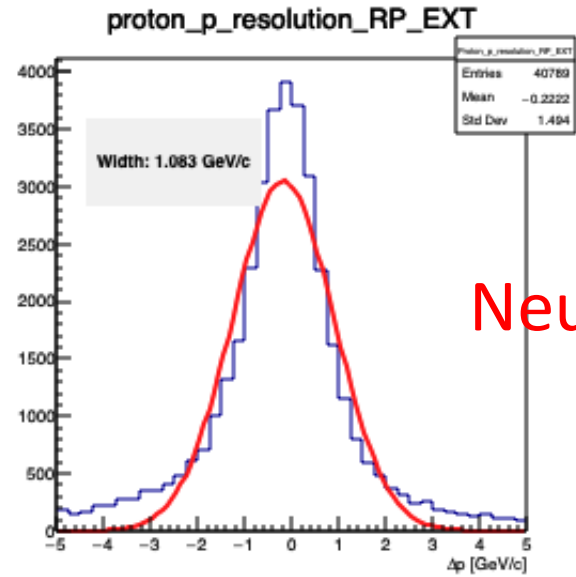
Obviously something screwy here –
should be fixed in the next day or so.

Spectator Proton (18x100 GeV)

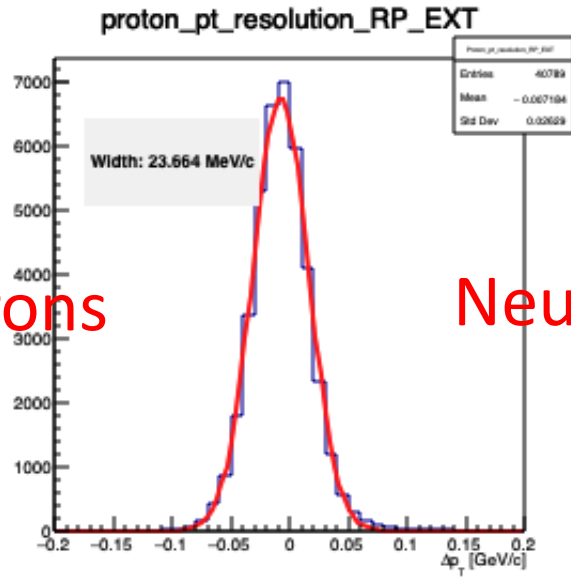


- Normal Roman Pots turned off for now – they capture almost nothing and add extra complexity.
- The External Silicon Sensors are “shifted” – this is a technical issue to derive the transport matrix (I can provide details for anyone interested).
- Extra note: the acceptance of protons will almost certainly change once a beam pipe is included.

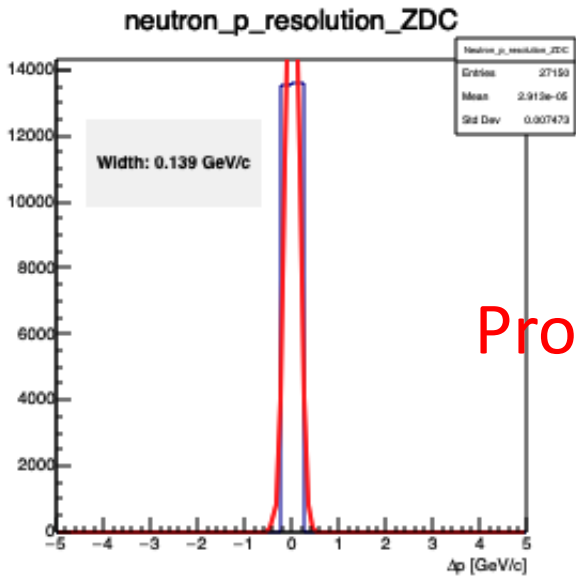
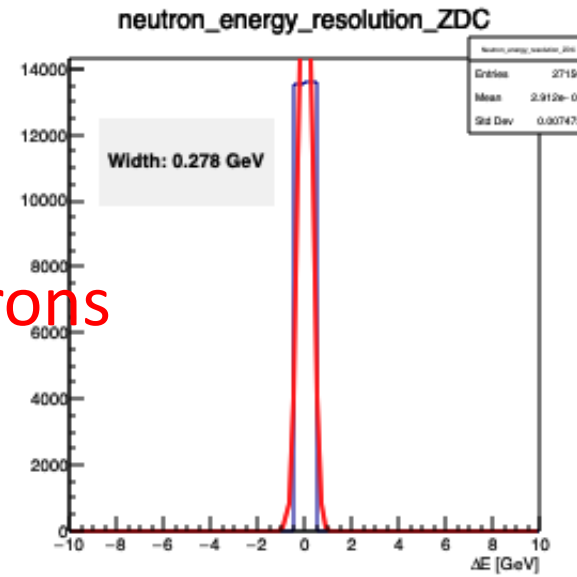
Spectator Proton (18x100 GeV) – absolute smearing



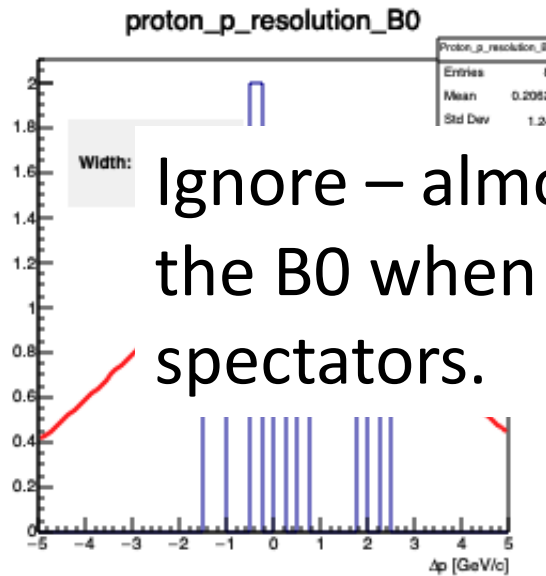
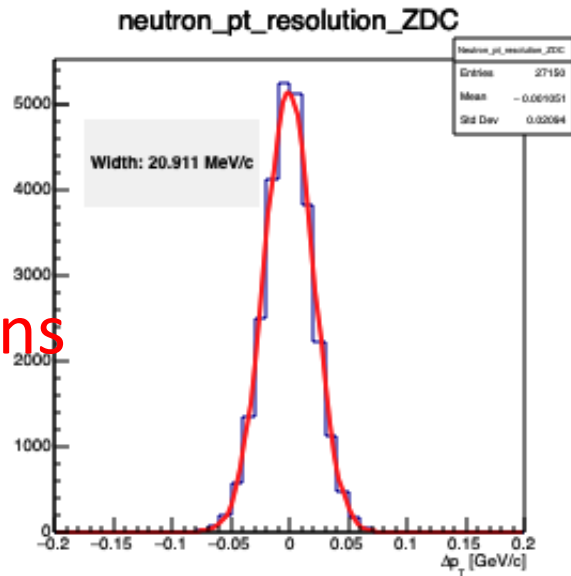
Neutrons



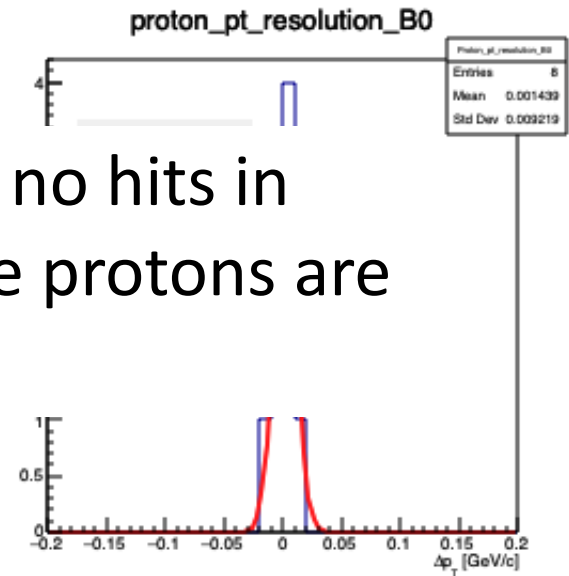
Neutrons



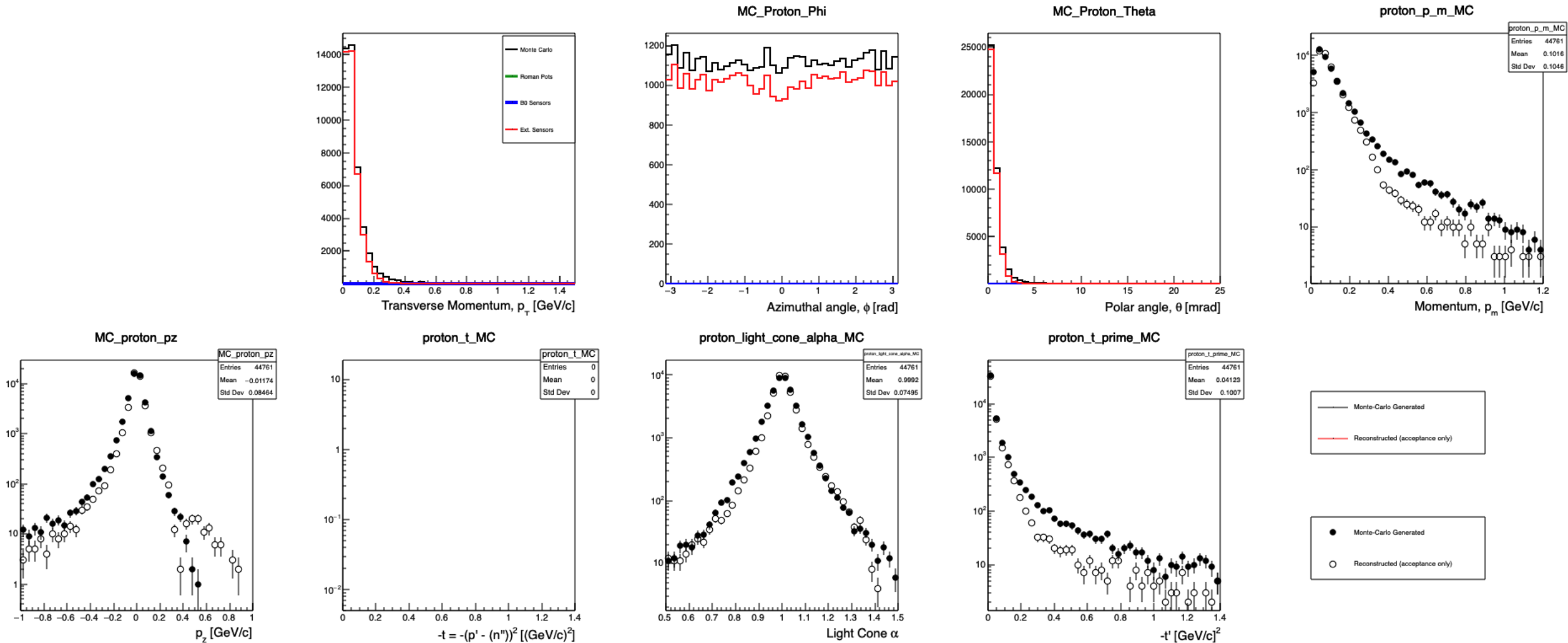
Protons



Ignore – almost no hits in the B0 when the protons are spectators.

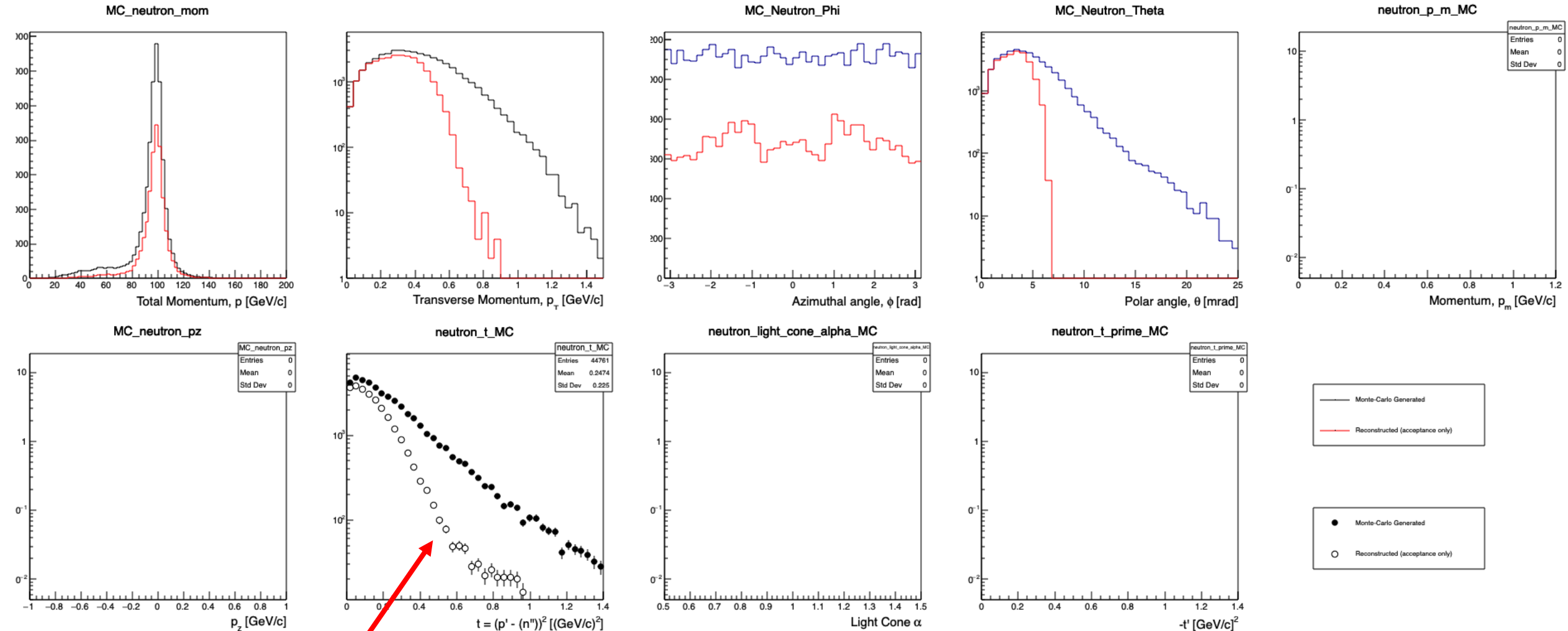


Spectator Proton (18x100 GeV)



All smearing included for protons. Still not sure about beam energy smearing – doesn't seem to have a strong effect, but should it?

Struck Neutron (18x100 GeV)



Given that the proton case looks funky, I want to check this as well.

Quick summary

- The tracking issue I was having before Temple is fixed. The various smearing effects are (mostly) included.
 - Need to check on the beam energy spread – seems too small?
 - Need to understand how the ZDC energy resolution *should* affect the momentum.
- Still an issue with my calculation of “t” – there’s a bug in there, I will find it quickly.
- Need input on how you prefer to see the comparison between MC and “detected” distributions.